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Assessment of knowledge, attitudes and practice of hand hygiene among Bachelor of Nursing Science students at AhmaduBello University Teaching Hospital, Zaria

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ABSTRACT
Microorganisms from the hands of healthcare workers is a source of cross-infection in hospitals and can be prevented by handwashing. Hand hygiene is a foremost technique to reduce nosocomial infections. It is the simplest method for control of nosocomial infections if done properly. This help prevent from a lot of costs and fatalities. Due to constant relationship with patients, nurses play veryimportant role in proper execution of hand hygiene among clinical personnels. This study aimed at assessing knowledge, attitudes and practice of hand hygiene among Undergraduate Nursing Students on clinical posting at Ahmadu Bello University, Zaria. A cross-sectional descriptive design was used. The objectives of the study were; To determine the level of knowledge of hand hygiene among the students, determine the students attitude towards hand hygiene compliance, identify the practice of hand hygiene anddetermine the relationship between knowledge and practice of hand hygiene among the student.Questionnaire was the tool for data collection. Out of 48 questionnaires distributed, 43 (90%) were retrieved and analyzed using SPSS version 22. The result showed that majority (62%) of the students had good knowledge about hand hygiene. Most (88.8%) had a positive attitude towards hand hygiene compliance. More than half(61.6%) of the respondents practiced hand hygiene. The study also revealed astrong relationship between knowledge and practice of hand hygiene among the respondents with (X^2) of 25.533 at P = 0.000. It was recommended that there is need for the authority of ABUTH to increase regular trainings among BNSc students with regard to hand hygiene and periodically monitor and record adherence to hand-hygiene performed by the students and provide feedback regarding their performance.
Key words: Attitude, Hand hygiene, Knowledge, Practice

Introduction

Health care-associated infections are the most common adverse event in health care resulting in a significant burden on patients, their families, and health care systems (World Health Organization, 2011). Alcohol based hand rub may be better than traditional hand washing as they require less time, acts faster, are less irritating, and contribute to sustained improvement in compliance associated with decreased infection rates (Pittet, 2011) . Failure to perform appropriate hand hygiene is considered to be the most leading cause of healthcare associated infections and the spread of multi-resistant micro- organisms. It has been recognized as a significant contributor to disease outbreaks (Allegranzi, Sax, Bengaly, Richet, Minta, Chraiti, 2010). Hand hygiene is the cornerstone measure of prevention of health care-associated infection and to ensure safe client care (Allegranzi, 2010). Cole (2010) reported that nursing students have a tendency to overestimate their hand hygiene (HH) knowledge and compliance due to their inability to give an objective account of their Hand Hygiene practices. This is of concern, given that lack of awareness and objectivity about one's HH practices while in school

may translate to poor compliance during post-graduation practice (Mortel, Kermode, Progano, 2012).Evidence from studies have shown that improved hand hygiene has substantially reduced nosocomial infections and cross-contamination of multi resistant infections in hospitals (Mathai, George , Abraham, 2011) It has also been shown to be associated with significant decrease in overall rates of respiratory infections in particular (Ekwere, Okafor , 2011). Hand hygiene in the health care setting has been encouraged for generations and has been identified as the single most important intervention for preventing the transmission of infections (Ansari, Gupta, Jais, Nangia, Gogo, Satia, 2015).Even though evidenced based guidelines for health care providers (HCPs) hand hygiene practices exist in many healthcare facilities, compliance with these are internationally low (Gould, Moralejo, Drey,Chudleigh. 2010) hand hygiene compliance rates among HCPs rarely exceeds 50% (Gilbert, Stafford, Crosby, Fleming, Gaynes, 2010). While lack of awareness and scientific knowledge regarding hand hygiene is believed to be a significant factor that could lead to inappropriate hand hygiene practices (Shinde, Mohita, 2014)

Variations in the practice of hand hygiene across the hospital wards and among the different cadres of HCPs have been found to be associated with good knowledge of hand hygiene (Hugonnet, Perneger, 2013). Widely varied and lower proportions of healthcare providers were knowledgeable regarding hand hygiene (Sharma, Sharma, Koushal, 2012).

Appropriate hand hygiene is singled out as the most important measure in preventing these infections. However, hand hygiene compliance among healthcare professionals remains low despite the well-known effect on infection reduction. Hand hygiene is paramount in preventing transmission of pathogen. Nursing students represent the future nursing workforce and must be prepared to demonstrate professional accountability and safe practice (Catherine, 2013).

Hand hygiene is a basic skill and key component of patient safety, and affects the morbidity and mortality of clients in all health care settings (PHAC, 2012). The hand hygiene habits nursing students develop in the course of their clinical rotations will affect their future practice (Kelcíkova, Skodova, &Straka, 2012). Hand hygiene has been recognized as the single most effective and cost-effective means of preventing hospital acquired infection, as well as an effective means of preventing illness in the community that may lead to hospitalization (Allengranzi, Sax, Bengaly, Richet, Minta and Chraiti, 2010). Despite this, many studies have documented that compliance with hand hygiene recommendations in healthcare settings is consistently less than 50% (Pettit et al, 2012).Intensive education programs have been associated with modest improvements in hand hygiene and dramatic reductions in rates of hospital-acquired infections (Allengranzi et al, 2014). Some of the factors that have contributed to poor hand hygiene compliance among health care workers, include lack of knowledge among personnel about the importance of hand hygiene in reducing the spread of infection and how hands become contaminated, lack of understanding of correct hand hygiene technique, understaffing and overcrowding, poor access to hand washing facilities, irritant contact dermatitis associated with frequent exposure to soap and water, and lack of institutional commitment to good hand hygiene(Pittet and Boyce,2011). Knowledge of hand hygiene as a measure to prevent health care-related infections comes from ancient times, but for many reasons it

has been neglected by many health professionals. Studies have so far shown the importance of assessing practitioners' knowledge, risks, attitudes and perceptions for hand hygiene as a means of designing healthcare-related infection prevention programs associated with any level of care (Abdella, Tefera, Eredie, Landers, Malefia, Alene, 2014)

According to Pittet et al., (2010) at any time, over 1.4 million people worldwide are suffering from infections acquired in hospitals and in modern hospitals in the developed world: 5-10% of patients acquire one or more infections in health care settings .In developing countries, the risk of health care-associated infection is 2 to 20 times higher than in developed countries and the proportion of patients affected by HAI can exceed 25% and these lead to the global burden and economic impact of HAI in the health care facilities. Hand washing with water and soap is an important means of preventing hospital acquired infections .However, the rate of hand washing with soap and water is unacceptably low amongst health workers in Nigeria. Few studies on this subject have been done amongst health workers in Nigeria (Alex-Hart, 2011). Health care associated infections are increasingly becoming a public health problem as there are approximately more than a million people who are infected with nosocomial infections in the world today(Darawad and Al-Hussami, 2013).

Health care students are exposed to infectious disease patients and as part of their clinical training may have to perform certain procedures on them which places this young inexperienced population at a significant risk of contracting as well as transmitting such diseases(AL-Rawajfah and Tubaishat, 2015). In a study conducted with Korean nursing students, HH knowledge was high with mean correct responses on HH knowledge questions of 68.1% (Jeong & Kim 2016).

In one study, HH knowledge in nursing students was compared to other healthcare students. The findings revealed a better HH knowledge in medical students in comparison with dental and nursing students (Thakker & Jadhav 2015).In Slovakia, nursing students had insufficient knowledge on HH concepts with a mean score of 63 of a possible score of 76 (Kelcikova, Skodova, & Straka 2012).

Based on the earlier mentioned researches, the researcher aims at exploring the gap in knowledge, attitudes and practice of hand hygiene among Bachelor of Nursing Science students (BNSc) on clinical posting at Ahmadu Bello University Teaching Hospital, Zaria.

Objectives of the study

1. To determine the level of knowledge of hand hygiene among BNSc students on clinical posting at ABUTH, Zaria.
2. To determine the attitude toward hand hygiene compliance on clinical posting at ABUTH, Zaria among BNSc students.
3. To identify the practice of hand hygiene on clinical posting at ABUTH, Zaria among BNSc students.
4. To determine the relationship between the level of knowledge and practice of hand hygiene among BNSc students on clinical posting at ABUTH, Zaria.

Scope of the study

The study will covers all BNSc students on clinical posting at ABUTH, Zaria, Kaduna state of Nigeria.

Methodology

Research design

A descriptive cross sectional survey design was used for this study.

Research setting

Ahmadu Bello university teaching hospital Zaria was establish in 1967, under Ahmadu Bello university law [amendment act] enacted by former premier of northern

Nigeria. By the 1st of April 1968 the institute of health had taken charge of the following main hospital, clinic and health centers in Kaduna, Zaria and Malumfashi which were formally run by northern Nigerian government. The Federal Government took over the affairs of all teaching hospitals were later controlled by the federal ministry of health. The institute of which was confined to work closely with the faculty of medicine. There is an interdepartmental academic disclose research unit as well as the hospital ethical consideration committee to monitor research studies. The hospital has a capacity of 547 beds, 547 nurses and laboratory workers among other staff. There are 23 departments in the hospital ranging from medicine, surgery, nursing services, psychiatry, conchology, radiology, etc.The objectives of the hospital are: to provide broad range of tertiary health services to meet the health care need of people from the region and country at large, provide technical support to primary and secondary health facilities within its area,conduct relevant research studies on prevailing health and health related problems and provide facilities for training of different cadres of health workers (ABUTH hospital records and statistics 2015)

Study population: This comprised the entire BNSc students who had been on clinical posting at ABUTH, Zaria. The populations of students were computed as follows

S/N	DUTY/POSTING PERIOD	NO. OF STUDENTS AT EACH SHIFT	TOTAL PERCENTAGES (%)
1	Morning duty	40	33.3
2	Afternoon duty	40	33.3
3	Night duty	40	33.3
	TOTAL	120	100

Therefore the total target population=120 students.

Sample size: Sample size was determined using Nwana (2007) formularwhich stated that 10-40% of population is adequate for research if the population of study is a few hundred. 40% of the population is considered a representative sample. The entire shifts (i.e. morning, afternoon and night) of the students were considered a cluster. Therefore, 40% (48 students) out of the 120 students were selected as the sample size.

Sampling technique: Cluster sampling technique was employed for this study. This was achieved by collecting the data through administering questionnaires to the respondents based on three clusters which are; morning duty, afternoon and night duty.

Instrument for data collection: The research instrument that was used for data collection was thequestionnaire which was adapted and modified by the researchers from similar research work of (WHO, 2010). The questionnaire was divided into four sectionsbased on the research objectives. Section A comprised of ; the Socio-demographic data, Section B- knowledge about hand hygiene, Section C- attitude towards hand hygiene compliance, Section D- hand hygiene practice. The questions were closed-ended.

The questions were checked for validity and reliability and found to be suitable.

Method of data analysis

Data obtained will be analyzes using descriptive statistic. Descriptive Statistical measures such as percentages and frequency distribution will be used in the analysis. The SPSS version 20.0 will be used to analyze the data.

Ethical consideration

Consent to conduct the study was obtained from the respondents. Approval was gotten

from the Ethical Research Unit of ABUTH Shika. Anonymity and confidentiality were ensured during data collection.

Data analysis and presentation

Forty eight (48) questionnaires were distributed among the students, forty three (43) were retrieved, properly filled and analyzed, implying 90% response rate. Data analysis was by the use of Statistical Package for Social Sciences (SPSS) software Version 22. Both descriptive and inferential statistics were done. The results were presented in frequency distributions tables and cross tabulation with Chi-square test.

Results

Table 1(a) shows that majority (79.1%) of the respondents were between the age range of 21-25 years with mean age of 23 and standard deviation of 2.794. Table 1(b) shows that most (65.1%) of the respondents were females. Table 1c shows that majority (39.5%) of the respondents were Hausa. Table 1d shows that most (79.1%) of the respondents were single. Table 1(e) shows that majority (79.1%) of the respondents were Muslims.Table 2 shows that, the respondents that scored 4-6 correct answers out of the total of 6 questions asked were labeled as having good knowledge (62%), those that scored 2-3 correct answers out of the total 6 questions asked were labeled as having moderate knowledge (30%) and those that scored only one or none were labeled as having poor knowledge (8%).Results on Table 3(a) shows that, 90.6% of the respondents adhered to correct hand hygiene practices at all times. Table 3 (b) shows that 86% confirmed that patient's rights are violated if a health care provider does not follow hand hygiene guidelines and healthcare associated infections are transmitted. Table 3(c)) also showed that 90.7% of the respondents agreed that emergencies and other priorities make hygiene more difficult at times. Table 3(d) shows that 90.6% of the respondents were not reluctant to ask others to engage in hand hygiene. Most (86%) of the respondents felt guilty if they omit hand hygiene (Table 3e).Concerning the practice of hand hygiene, Table 4(a) shows that, most (90.7%) of the respondents practiced hand hygiene in their hospitals. Most (72.1%) of the respondents confirmed that protection of both the patients and themselves motivated them to performs hand hygiene (Table 4b). Table 4(c) also reveals that most (39.5%) of the respondents don`t wash their hands some times because they forget. Table 4(d) shows that more than half (55.5%) of respondents performed alcohol-based hand rub in 20 seconds to kill most germs on their hands. Table 4(e) indicates that most (48.8%) of the respondents use soap and water to wash their hands before abdominal palpation. Table 4(f) reveals that most (65.1%) of the respondents combine hand washing with soap, water and alcohol based hand rub to wash their hands after visible exposure to blood.Table 5 shows that, computed Chi-square value (X^2) was 25.533 at P = 0.000 which was less than the acceptable 5% error margin. This signifies a strong evidence of a relationship between knowledge and practice of hand hygiene among the respondents.

Table 1: Socio-demographic data of the respondents

VARIABLES	FREQUENCIES	PERCENTAGES
(a) AGE (years)		
16-20	1	2.3
21-25	34	79.1
26-30	6	14.0
31-35	2	4.7
Total	43	100.0
(b) Gender		
MALE	15	34.9
FEMALE	28	65.1
Total	43	100.0
(c) Ethnicity		

HAUSA	17	39.5
FULANI	9	20.9
YORUBA	5	11.6
OTHERS	12	27.9
Total	43	100.0
(d) marital status		
SINGLE	34	79.1
MARRIED	6	14.0
DIVORCED	3	7.0
Total	43	100.0
(e) religion		
ISLAM	34	79.1
CHRISTIANITY	6	14.0
TRADITIONAL	3	7.0
Total	43	100.0

Mean age =23, Standard deviation =2.794

Table 2: Level of knowledge about hand hygiene among respondents

LEVEL OF KNOWLEDGE	FREQUENCY	PERCENTAGE (%)
GOOD	27	62
MODERATE	13	30
POOR	3	8
TOTAL	43	1OO

Table 3: Attitudes toward hand hygiene compliance among respondents

VARIABLES	FREQUENCY	PERCENTAGE	MEAN
a) I adhere to correct hand hygiene practices at all times			2.49
SD	2	4.7	
D	2	4.7	
A	12	27.9	
SA	27	62.8	
b) Patient's rights are violated if a health care provider does not follow hand hygiene guidelines and a healthcare associated infections are transmitted			2.28
SD	3	7.0	
D	3	7.0	
A	16	37.2	
SA	21	48.8	
c) Emergencies and other priorities make hygiene more difficult at times			2.30
SD	1	2.3	
D	3	7.0	
A	21	48.8	
SA	18	41.9	
d) I am reluctant to ask others to engage in hand hygiene			2.12
SA	2	4.7	
A	2	4.7	
D	28	65.1	
SD	11	25.6	
e) I feel guilty if i omit hand hygiene	0	0	2.21
SD			
D	6	14.0	
A	22	51.2	
SA	15	34.9	
Aggregate percentage of positive attitude		88.8	
Aggregate percentage of negative attitude		11.2	
Aggregate mean			2.28

Key: SA= strongly agree, A=agree, D=disagree, SD= strongly disagree

Table 4: Practice of hand hygiene.

Variables	Frequencie	Percentage
(a) Did you practice		
YES	39	90.7
NO	4	9.3
Total	43	100.0
(b) What motivates you		
Protection for the	3	7.0
Protection for myself	8	18.6
Protection of both my	31	72.1
Concerns over	1	2.3
Total	43	100.0
(c) I can't wash my		
too busy	13	30.2
forget or don't think	17	39.5
products(s) not in	10	23.3
products(s) or practice	3	7.0
Total	43	100.0
(d) What is the minimal		
20 seconds	23	53.5
3 seconds	3	7.0
5 minutes	7	16.3
10 seconds	10	23.3
Total	43	100.0
(e) Which type of hand		
Hand washing with	21	48.8
Alcohol-based hand	13	30.2
Combine	9	20.9
Total	43	100.0
(f) Which type of hand		
Hand Washing with	9	20.9
Alcohol-based hand	5	11.6
Combine	28	65.1
None of the above	1	2.3
Total	43	100.0
Aggregate percentage		61.62
Aggregate percentage		38.38

Table 5: Relationship between Knowledge of respondents and practice of hand hygiene.

Knowledge and Practice of hand hygiene among respondens			
Knowledge on five moments of hand hygiene	Practice of hand hygiene		Total
	YES	NO	
• Before clean/ aseptic procedure	1	1	2
• After body fluid exposure	1	0	1
• After touching patients surroundings	0	2	2
• Before speaking to a patient	37	1	38
Total	39	4	43

Chi-square (X^2) =25.533, P-value=0.000; DF=3

Discussion: The study revealed that, most(62%) of the respondents had good knowledge regarding hand hygiene. This is in line with the study conducted by Asadollahi (2015) in Tabriz, which showed that the nurses were knowledgeable about hand hygiene in hospital at average level.Majority (88.8%) of the respondents had positive attitude towards hand hygiene compliance. This is in line with a pioneering study conducted by Al – Wazzan (2011) among nursing staff in Secondary Care Hospitals in Kuwait, which showed that, out of the 454 nursing staff that participated in self-reported compliance, 90% indicated that they always washed their hands upon practicing patient care activities. This may be due to high standard level of the profession.The resultsfurther revealed that 61.62% of the respondents practiced hand hygiene.This is in contrast with the study conducted by Asare (2009) in Ghana to assess hand hygiene practices in a neonatal intensive care unit and found that, hand

hygiene compliance of physicians and nurses was low. The differences in the results might be due to an increase in knowledge as time pass by.

The study established a relationship between knowledge and practice of hand hygiene ($p=0.000$, $X^2=25.533$). This is in line with the pioneering study by Khaled (2014) who conducted a cross sectional descriptive and observational study to assess the relationship between knowledge, and practices of hand hygiene among health care workers (HCW) in Ain-Shams University hospitals and also to assess its different wards for facilities required for hand hygiene. The researcher found a significant relationship between knowledge and practice of hand hygiene among health care workers with X2= 14.312 and P = 0.026.The similarity of the result might be due to high standardization of the facilities.

Conclusion

Majority of the students had good knowledge on hand hygiene. Most, also showed a positive attitude towards hand hygiene. Similarly, majority practiced hand hygiene. The study further revealed astrong evidence of a relationship between knowledge and practice of hand hygiene among the respondents with (X^2) of 25.533 at P = 0.000. In order to improve the students' practice more than ever, it was recommended to prepare and execute an applied plan including appropriate principles, procedures, theoretical and practical manual.Therefore, nurses are required to contribute to the increase the level of awareness and also practice of hand hygiene among health care professionals. Notwithstanding, there is need to increase regular training among students with regard to hand hygiene since not all were knowledgeable and practiced hand hygiene accordingly.

References

Abdella, N.M, Tefera, M.A., Eredie, A.E., Landers, T.F.,Malefia, Y.D., Alene, K.A.2014. Hand hygiene compliance and associated factors among health care providers in Gondar University Hospital, Gondar, North West Ethiopia. BMC Public Health articles/10.1186/1471-2458-14-96

Alex-Hart, B&Opara, P.I. 2011.Handwashing Practices amongst Health Workers in a Teaching Hospital, **DOI :** 10.3844/ajidsp.2011.8.15. American Journal of Infectious Diseases, *Volume 7, Issue 1, Pages 8-15*

Allegranzi, B, Sax, H., Bengaly, Richet, H., Minta, D., Chraiti, M, 2010.Successful implementation of the WHO improvement strategy in a referral hospital Mali.

Al Rawajfah, O.M. &Tubaishat, A. 2015. Nursing students' knowledge and practices of standard precautions: a Jordanian web-based survey. Nurse Education Today, 35 (12), 1175–1180.

Al-Wazzan, B. 2011. Hand Hygiene Practices among Nursing Staff in Public Secondary Care Hospitals in Kuwait: Self-Report and Direct Observation. Medical Principles and Practice **20**:326–31. Online at http://www.karger.com/Article/Pdf/324545 (accessed 27 March 2016

Ansari, S.K, Gupta, P., Jais, M., Nangia, S., Gogo, S., Satia, S. 2015. Assessment of knowledge, attitude and practicesregarding hand hygiene amongst the health care workers in a tertiary health care centre. Int J Pharm Res Health Sci.;3(3):720-726.

Asadollahi, M, Bostanabad, M. A, Jebraili, M, Mahallei, M, Rasooli, A. S, 2015. Abdolalipour, M. Nurses' Knowledge Regarding Hand Hygiene and Its Individual and Organizational Predictors. Journal of Caring Sciences;4(1):45. [PMC free article] [PubMed]

Asare, A, Enweronu – Laryea CC, Newman M.J.2009 Hand hygiene practice in neonatal Intensive care unit inGhane.J.; 1: 3(5): 352-6.

Catherine, s., 2015.hand hygiene in undergraduate nursing education in Alberta

Cole, M. 2010.Exploring the hand hygiene competence of student nurses: A case of flawed self assessment. Nurse Education Today 29(4): 380–388.

Darawad, M. W., & Al-Hussami, M. (2013).
Jordanian nursing students' knowledge of, attitudes towards, and
compliance with infection control precautions. Nurse education today, 33, 580-583.
http://dx.doi.org/10.1016/j.nedt.2012.06.009
Darawad, M. W., & Al-Hussami, M. (2013).
Jordanian nursing students' knowledge of, attitudes towards, and
compliance with infection control precautions. Nurse education today, 33, 580-583.
http://dx.doi.org/10.1016/j.nedt.2012.06.009
Darawad, M. W., & Al-Hussami, M. (2013).
Jordanian nursing students' knowledge of, attitudes towards, and
compliance with infection control precautions. Nurse education today, 33, 580-583.
http://dx.doi.org/10.1016/j.nedt.2012.06.009
Darawad, M. W., & Al-Hussami, M. (2013).
Jordanian nursing students' knowledge of, attitudes towards, and
compliance with infection control precautions. Nurse education today, 33, 580-583.
http://dx.doi.org/10.1016/j.nedt.2012.06.009
Darawad, M. W., & Al-Hussami, M. (2013).
Jordanian nursing students' knowledge of, attitudes towards, and
compliance with infection control precautions. Nurse education today, 33, 580-583.
http://dx.doi.org/10.1016/j.nedt.2012.06.009

Darawad, M. W., & Al-Hussami, M. 2013. Jordanian nursing students' knowledge of, attitudes towards, and compliance with infection control precautions. Nurse education today, 33, 580-583. http://dx.doi.org/10.1016/j.nedt.

Ekwere, T.A, Okafor, I.P. 2011. Hand hygiene knowledge and practices among health care providers in a tertiary hospital, Southwest Nigeria. Int J Infect Control. 9(4):1-10.

Gould, D.J., Moralejo, D., Drey, N., Chudleigh, J.H. 2010. Interventions to improve hand hygiene compliance in patient care. Cochrane Database Syst Rev.9:CD005186.

Gilbert K, Stafford, C., Crosby, K., Fleming, E., Gaynes, R. 2010. Does hand hygiene compliance among health care workers change when patients are in contact precaution roomsinICUs? Am J Infect Control. 38(7):515-7

Hugonnet, S., Perneger, T.V., Pittet, D. 2013. Alcohol – based hand rub improves compliance with hand hygiene in intensive care units. Arch Intern Med. 162(9): 1037-43.

Jeong, S.Y. & Kim, K.M. 2016.Influencing factors on hand hygiene behavior of nursing students based on theory of planned behavior: a descriptive survey study. Nurse Education Today, 36, 159–164.

Khaled, M., Elaziz, A., Bakr, I.M. 2008. Assessment of knowledge, attitude and practice of
hand washing among health care workers in Ain Shams University hospitals in Cairo. The Egyptian Journal of Community Medicine; 26(2):1-12

Darawad, M. W., & Al-Hussami, M. (2013).
Jordanian nursing students' knowledge of, attitudes towards, and
compliance with infection control precautions. Nurse education today, 33, 580-583.
http://dx.doi.org/10.1016/j.nedt.2012.06.009
Darawad, M. W., & Al-Hussami, M. (2013).
Jordanian nursing students' knowledge of, attitudes towards, and
compliance with infection control precautions. Nurse education today, 33, 580-583.
http://dx.doi.org/10.1016/j.nedt.2012.06.009

Kelcikova, S., Skodova, Z. &Straka, S. 2012. Effectiveness of hand hygiene education in a basic nursing school curriculum. Public Health Nursing, 29 (2), 152–159

Mathai, A.S., George, S.E., Abraham, J. 2011. Efficacy of multi-model interventional strategy in improving hand hygiene compliance in tertiary level intensive care unit. Indian J Critical Care Med. 15(1):6-15.

Mortell, M. 2012. Hand hygiene compliance: Is there a theory-practice-ethics gap? British Journal of Nursing, 21, 1011−1014. doi:10.12968/bjon.2012.21.17.1011

Pittet, D. 2011. Improving Adherence to Hand hygiene practices.Emerg Infect Dis. 7: 234-40.

Public Health Agency of Canada.2012. Hand hygiene practices in healthcare settings. Retrieved from http://publications.gc.ca/collections/collection_2012/aspcphac/HP40-74-2012-eng.pdf

Sharma, R., Sharma, M., Koushal, V., 2012.Hand washing compliance among healthcare staff in intensive care unit of a Multispecialty hospital of north India. J. Hosp. Adm. 1(2):27- 33.

Shinde, M.B., Mohita, V. 2014. A study to assess knowledge, attitude and practices of five moments of hand hygiene among nursing staff and students at a tertiary care hospital at Karad. Intl J SciRes.3(2):311-321.

Shinde, M.B., Mohita, V. 2014. A study to assess knowledge, attitude and practices of five moments of hand hygiene among nursing staff and students at a tertiary care hospital at Karad. Intl J Sci Res. 3(2):311-321.

Thakker, V.S. &Jadhav, P.R. 2015. Knowledge of hand hygiene in undergraduate medical, dental, and nursing students: a cross-sectional survey. Journal of Family Medicine and Primary Care, 4 (4), 582–586.

WHO2011.The Burden of health care-associated infection worldwide. A Summary .Available from :http://www.who.int/gpsc/country_work/summary_20100430_en.pdf

WHO hand hygieneimprovementtools to support the implementation of national/sub-national hand hygienecampaigns(http://www.who.int/gpsc/5may/background/5moments/en/index.html